



IN THE CLAIMS:

1. - 4. (canceled)

5. (previously presented) An encoder for encoding a first bit stream, comprising:
means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;
means for generating a first bit and a second bit for each bit in the first bit stream;
and
means for generating a third bit and a fourth bit for each bit in the second bit stream., wherein the means for generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

6. - 8. (canceled)

9. (previously presented) An encoder for encoding a first bit stream, comprising:
means for generating a first encoder first bit and a first encoder second bit for each bit in the first bit stream;
means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;
means for generating a second encoder first bit and a second encoder second bit for each bit in the second bit stream; and
means for multiplexing the first bit stream, the first encoder first bit, the first encoder second bit, the second encoder first bit, and the second encoder second bit,
wherein the means for generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

10. - 12. (canceled)

13. (previously presented) A method for encoding a first bit stream, comprising:
receiving the first bit stream;

encoding the first bit stream with a first encoder to generate a first encoder first bit and a first encoder second bit for each bit in the first bit stream;

generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

encoding the second bit stream with a second encoder to generate a second encoder first bit and a second encoder second bit for each bit in the second bit stream;
and

multiplexing the first bit stream, the first encoder first bit, the first encoder second bit, the second encoder first bit, and the second encoder second bit, wherein the step of generating a second bit stream comprises at least one of a ones complemeter and a differential encoder.

14. (original) A method for encoding a first bit stream, comprising:

receiving the first bit stream; encoding the first bit stream with a first encoder to generate a first encoder first bit and a first encoder second bit for each bit in the first bit stream;

generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream; generating an interleaved bit stream from the second bit stream;

encoding the interleaved bit stream to generate a second encoder first bit and a second encoder second bit for each bit in the interleaved bit stream; and

multiplexing the first bit stream, the first encoder first bit, the first encoder second bit, the second encoder first bit, and the second encoder second bit.

15. (original) The method of claim 14, wherein the step of encoding the first bit stream further comprises utilizing a constitute encoder to generate a first encoder first bit and a first encoder second bit.

16. (original) The method of claim 14, wherein the step of encoding the interleaved bit stream further comprises utilizing a constitute encoder to generate a second encoder first bit and a second encoder second bit.

17. (original) The method of claim 14, wherein the step of generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

18. (original) A decoder for decoding a first bit stream of received bits, comprising:

first decoding means for converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values that the corresponding received bit is a one from an early iteration, to a first stream of probability values that the corresponding received bit is a one;

first sign inverting means for inverting the signs of the first stream of probability values; means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

second decoding means for converting the first stream of probability values, the second bit stream, a stream of second decoder first bits, and a stream of second decoder

second bits, to a second stream of probability values that the corresponding bit of the second bit stream is a zero; and

second sign inverting means for inverting the signs of the second stream of probability values.

19. (original) The decoder of claim 18, further comprising an interleaver means for reordering at least one of the first bit stream and the second bit stream.

20. (original) The decoder of claim 18, wherein the means for generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

21. (original) A decoder for decoding a first bit stream of received bits, comprising:

first decoding means for converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values that a corresponding received bit is a one from an early iteration, to a first stream of probability values that the corresponding received bit is a one;

first decoder interleaver means for reordering the stream of probability values to the order required by a second decoder;

first sign inverting means for inverting the signs of the first stream of probability values;

second decoder interleaver means for reordering the stream of received bits to the order required by the second decoder;

means for generating a second bit stream of the reordered bits, the second bit stream having one or more different corresponding bit values than the reordered bits produced by the second decoder interleaver means;

second decoding means for converting the first stream of probability values, the second bit stream, a stream of second decoder first bits, and a stream of second decoder second bits, to a second stream of probability values that the corresponding bit of the second bit stream is a one;

de-interleaver means for reordering the second stream of probability values for reordering the second stream of probability values to the order required by the first decoder; second sign inverting means for inverting the signs of the second stream of probability values; and

decision unit means for allowing one or more iterations of determining the second stream of probability values.

22. (previously presented) The decoder of claim 21, wherein the means for generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

23. (original) A method for decoding a first bit stream of received bits, comprising:

converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values from an early iteration, to a first stream of probability values that the corresponding bit of the first bit stream is a one;

inverting the signs of the first stream of probability values; generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

converting the first stream of probability values, the second bit stream, a stream of second decoder first bits, and a stream of second decoder second bits, to a second stream

of probability values that the corresponding bit of the second bit stream is a zero;
inverting the signs of the second stream of probability values; and
repeating the above steps a specified number of iterations.

24. (original) The method of claim 23, further comprising interleaving at least one of the first bit stream and the second bit stream.

25. (original) The method of claim 23, wherein the step of generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

26. (original) A method of decoding a first bit stream of received bits, comprising:
converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values that the corresponding received bit is a one from an early iteration, to a first stream of probability values that the corresponding bit in the first bit stream is a one;

reordering the first stream of probability values to the order required by a second decoder; inverting the signs of the first stream of probability values;

interleaving the first bit stream of received bits to the order required by the second decoder, creating a reordered bit stream;

generating a second bit stream of the reordered bits, the second bit stream having one or more different corresponding bit values than the first bit stream;

converting the first stream of probability values, the second bit stream, a stream of second decoder first bits, and a stream of second decoder second bits, to a second stream of probability values that the corresponding bit of the ones complement bit stream is a zero;

de-interleaving the second stream of probability values for reordering the second stream of probability values to the order required by the first decoder;
inverting the signs of the second stream of probability values; and
repeating the above steps a specified number of iterations.

27. (original) The method of claim 26, wherein the step of generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

28. - 29. (canceled).

30. (previously presented) An apparatus comprising an encoder for encoding a first bit stream, comprising:

means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

means for encoding a first bit and a second bit for each bit in the first bit stream;
and

means for encoding a third bit and a fourth bit for each bit in the second bit stream,

wherein the means for generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

31. (canceled)

32. (previously presented) An apparatus comprising an encoder for encoding a first bit stream, comprising:

means for generating a first encoder first bit and a first encoder second bit for each bit in the first bit stream;

means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

means for generating a second encoder first bit and a second encoder second bit for each bit in the second bit stream; and

means for multiplexing the first bit stream, the first encoder first bit, the first encoder second bit, the second encoder first bit, and the second encoder second bit,

wherein the means for generating a second bit stream comprises at least one of a ones complemeter and a differential encoder.

33. (canceled)

34. (original) An apparatus comprising a decoder for decoding a first bit stream of received bits, comprising:

first decoding means for converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values that the corresponding received bit is a one from an early iteration, to a first stream of probability values that the corresponding received bit is a one;

first sign inverting means for inverting the signs of the first stream of probability values;

means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

second decoding means for converting the first stream of probability values, the second bit stream, a second decoder first bit, and a second decoder second bit, to a second

stream of probability values that the corresponding bit of the second bit stream is a zero;
and

second sign inverting means for inverting the signs of the second stream of probability values.

35. (original) A module comprising a decoder for decoding a first bit stream of received bits, comprising:

first decoding means for converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values that the corresponding received bit is a one from an early iteration, to a first stream of probability values that the corresponding received bit is a one;

first sign inverting means for inverting the signs of the first stream of probability values;

means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

second decoder means for converting the first stream of probability values, the second bit stream, a second decoder first bit, and a second decoder second bit, to a second stream of probability values that the corresponding bit of the second bit stream is a zero;
and

second sign inverting means for inverting the signs of the second stream of probability values.